2 Theoretical Underpinning

"It is the theory that decides what we can observe."

– Albert Einstein

This chapter introduces the theoretical underpinning for the present empirical study. Recently, customer co-design has been intensively investigated in the online mass customization context.[189] Müller (2007) argues that this development is strongly related to the potential and the diffusion of the internet, which enhances product individualization through online media and direct customer integration. Moreover, providers argue that the online context allows to decrease the costs of the transaction to be decreased and efficient processes of co-design to be built.[190] Lee and Chang (2011) even argue that the

> *"use of the Internet is considered necessary in customizing products in that it has allowed effective and spontaneous communication between company and consumer"*[191]

One important element of online media for customer co-design is toolkits. Online toolkits allow customers to take control over of the design process and concurrently enable mass customizers to control transaction costs.[192] Customers may apply the online toolkit to choose from a range of options available for the desired product and proceed to the check-out. Within this process, various technically- and socially-induced feedback mechanisms are provided to facilitate positive reinforcement. The major risk providers face is that customers, for any given reason, abandon their design activities, leave the process and don't return.[193] Thus the appropriate design of online toolkits is an important aspect for the success of mass customization businesses.

The various online feedback mechanisms, which are expected to yield positive reinforcement in this design process, are introduced below. These mechanisms are

[189] Piller et al. (2005, p. 7); Dellaert and Stremersch (2005); Franke and Piller (2004); Kamali and Loker (2002); Dellaert and Dabholkar (2009)

[190] Müller (2007)

[191] Lee and Chang (2011, p. 171) based on Anderson (2008); Hibbard (1999); Kim (2002)

[192] Franke and Piller (2004)

[193] Dellaert and Stremersch (2005)

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supported through different online media. A remarkable difference in online media is the level of richness they provide. Therefore the theory of media richness will be introduced.

2.1 Mechanisms of Feedback in Co-Design

As stated previously, supporting customers through feedback is supposed to add value to the customer co-design process. However, the sources of feedback vary fundamentally in their basic characteristics. This fact can be stated when reviewing and comparing examples in the mass customization practice, e.g. the cases of spreadshirt and selve. Turner et al. (2012) deliver a meaningful differentiation of feedback sources through their synthesis of extant literature focusing on: *How to increase the value of a co-design experience*.[194]

The authors primarily differentiate between *embedded* and *interpersonal* feedback, basically taking account of the fact that feedback may be induced and facilitated technically or socially. According to the authors, embedded feedback is integrated into the toolkit and includes such elements such as trial and error or visualization. Interpersonal feedback emphasizes the social role, e.g. exchange, advice, help or assistance via interaction with other people. Here, the authors further differentiate between interpersonal feedback through from sales personnel and from peer users within certain communities.[195] Franke et al. (2008) empirically investigate each singular stage within the customer co-design process and conclude that feedback from a user community may positively impact the design process, specifically in the development phase, i.e. when the user creates an initial idea of the design, as well as in the evaluation phase, i.e. when the customer finalizes the design specification according to his or her needs.

The idea of differentiating between *embedded* and *interpersonal* feedback directly relates to the discussion on interactivity in the online context. As Rafaeli and Yaron (2007) note, interactivity has been defined differently depending upon the research perspective and field of inquiry.[196] The latter authors for example refer to the process-related perspective in the field of computer-mediated research. From this discussion, it can be derived that interactivity is a frequently applied notion in academia as well as in practice, especially in terms of online communication. Bucy

[194] Turner et al. (2012)
[195] Franke et al. (2008)
[196] Rafaeli and Ariel (2009)

and Tao (2007) note that interactivity in the online context exhibits specific facets and thus requires a different treatment compared to the 'offline' context.[197] Yoo et al. (2010) note:

> *"The nature of e-interactivity including both computer mediated interaction and media interaction is different from offline interactivity, which is mainly based on face-to-face interaction."*[198]

On an abstract level interactivity is generally perceived as an inherent element of the internet and its various media; thereby it is frequently attributed with positive effects if the degree of interactivity rises, i.e. for e-learning environments or customer purchase intentions.[199] However, Fortin and Dholakia (2005) cite interactivity as a typical 'buzzword' which is 'hyped' in the press as well as in professional journals.[200] This is especially observable in research into new forms of co-creation, i.e. customer co-design, which nowadays rely to a certain extent on new communication technologies.[201] The relevance of interactivity in the e-commerce context, such as in online customer co-design in mass customization businesses, has been widely acknowledged and has attracted a lot of interest as researchers and practitioners increasingly emphasize its importance in website design.[202]

However, researchers argue that a major problem occurs through the often neglected differentiation between interaction with a technical device, and interaction with a person by way of a technical device.[203] Therefore Zhenhui et al. (2010) make a distinction between mechanical interactivity and social interactivity in online shopping. In the same vein, Stromer-Galley (2004) differentiates between interactivity-as-product (user interaction with technology) and interactivity-as-process (human interaction).[204] Accordingly, Leiner and Quiring (2008) use the notions of 'user-to-system interactivity' and 'user-to-user interactivity.[205] User-to-system interactivity refers to the interaction between a user and a system, i.e. a website. User-to-user Interactivity refers to the interaction between two or more users, which is fostered through technology, i.e. the web. Therefore the exchange

[197] Bucy and Tao (2007)
[198] Yoo et al. (2010, p. 90)
[199] Zhenhui, Jason, Bernard and Wei (2010)
[200] Fortin and Dholakia (2005, p. 388)
[201] Kiousis (2002)
[202] Yoo et al. (2010); Yadav and Varadarajan (2005)
[203] Zhenhui et al. (2010)
[204] Stromer-Galley (2004)
[205] Leiner and Quiring (2008)

may occur synchronously, i.e. at the same time (through text or voice chat) or asynchronously, i.e. at various points in time (e.g. via e-mail or on a forum).[206] However, this differentiation is of high relevance, as the type of interactivity may have a major influence on customers' perceived value of co-design activities. Or, as Piller et al. (2005), based on Kamali and Loker (2002), argue:

> *"Controlling for the level of channel knowledge and use, increased interactivity provided by design involvement motivated consumers to purchase and may increase the willingness to pay"*[207]

However, a deep understanding of this complex construct is still lacking as Zhenhui et al. argue (2010).[208] The latter authors state that past research has frequently investigated interactivity as a singular dimension and has doubtlessly identified relevant relationships. However, those studies failed to study interactivity on a more granular level to better understand this complex and multi-faceted construct and its effect on customer perceptions and purchase intentions. Further on, the authors argue that these studies are fundamental for producing relevant guidelines for practitioners in terms of website design. Yoo et al. (2010) tried to fill this gap in research and investigated the impact of interactivity on perceived value. In their respective study the authors differentiate interactivity along the three dimensions of controllability, bi-directionality and synchronicity.[209] On the basis of the analysis, they conclude that higher levels of bi-directionality foster hedonic value perceptions, while higher levels of synchronicity impact utilitarian value perception. Bi-directionality refers to the social facet of interactivity and covers the degree to which a website offers users the possibility to contact sales representatives directly. Synchronicity refers more to the technical facet of interactivity which covers the question of how fast the website responds to customer input.

2.2 Media Richness Theory

As Aurora et al. (2008) and Turner et al. (2012) emphasize, interactive media for customer co-design should provide human feedback mechanisms which enable customers to "*learn from the experience of others*" and thus receive positive

[206] Bucy and Tao (2007); Kiousis (2002); Suh and Lee (2005)
[207] Piller et al. (2005); Kamali and Loker (2002)
[208] Zhenhui et al. (2010, p. 35)
[209] Yoo et al. (2010)

reinforcement on their progress.[210] A remarkable difference in interactive media for interpersonal communication is the level of richness they provide.[211] The concept of richness and thus the link to media richness is frequently found in conceptual as well as empirical studies investigating the online consumer context.[212]

The theory of media richness was initially introduced by Daft and Lengel (1986).[213] It has been developed within an organizational context investigating the behavior of managers in terms of media choice.[214] The theory differentiates media along the dimension of richness, which is - unlike social presence - a multi-dimensional construct. The theory assumes, that the task, i.e. co-designing a product, may be differentiated and characterized in terms of uncertainty and equivocality. Hence the theory - in its basic understanding - distinguishes between *poor* and *rich* media due to their specific characteristics. It postulates that, depending on the nature of the co-design task, one medium will prove to be particularly useful. As Beck (2006) notes, the more cues a medium offers, the more it approaches traditional face-to-face communication and thus facilitates social interaction.[215] For example, video conferencing is typically considered to be a mode of *rich media* and this form is expected to prove appropriate for co-design tasks of high uncertainty and high equivocality. By contrast, *email* is frequently associated as a *poor* medium and should therefore be more appropriate for structured tasks, i.e. tasks of low uncertainty and low equivocality.

According to the authors, media richness is thereby a higher-order construct, which is based on the following four subordinated dimensions:[216]

- *Immediate feedback*: Media vary in their capability to allow communication partners to give immediate feedback or not. In face-to-face situations, the immediacy of feedback is perceived as very high, because people may instantly react, e.g. through facial mimic. In written communication via email, immediacy of feedback is lower, as the technical infrastructure first needs to process the communication.

[210] Arora et al. (2008); Turner et al. (2012)
[211] Palmer (2002)
[212] Fortin and Dholakia (2005)
[213] Daft and Lengel (1986)
[214] Daft and Lengel (1983), Daft and Lengel (1986)
[215] Beck (2006, p. 51)
[216] Daft and Lengel (1986, p. 560)

- *Number of cues and channels*: The more cues and channels available, the higher the richness of the applied medium. It is argued that, in a telephone situation, voice and tone are additional cues which complement the verbal information, which is exchanged between the communication partners. Again, in written communication, fewer cues are available, although partners may express emotions through the use of emoticons.
- *Personalization*: This aspect considers the amount of personal information which can be transmitted through the use of the medium. Emotions can be named as one example. If the medium is able to transport more of that kind of personal information, it can be regard as *richer*.
- *Language variety*: The more natural language can be used, the richer the medium will be perceived. In a setting where communication partners may convey audiovisual information, the language variety is considered to be greater compared to a situation in which only written communication is allowed.

Based on empirical research Daft and Lengel (1986) elaborate the theory by developing the *model of media richness* which builds upon the differentiation between 'poor' and 'rich' media.[217] The authors propose a model which suggests a two-dimensional matrix of media richness and task complexity. The model proposes a corridor of fit, in which media richness meets the needs of the task characteristics. Outside of the ideal corridor of fit, the match between media richness and task characteristics will lead to oversimplification or overcomplication of the situational context.

As stated above, media richness theory was primarily applied in an intra-organizational context. However, few studies have verified its applicability to the e-commerce context.[218] Within this research stream, richness characterizes the ability of the interactive medium to exchange an understanding about the current situation and progress. In a situation where customers decide to request online feedback from other individuals – whether peers or salespersons – the medium needs to deliver the appropriate level of richness. This way it can be assured that the communication partners understand each other. Studies indicate that richer media (compared to poorer media) decrease coordination problems in situations where multiple individuals engage in a collaborative shopping process. It is also indicated that

[217] Daft and Lengel (1983), Daft and Lengel (1986); Reichwald, Möslein, Sachenberger, Englberger and Oldenburg (1998, p. 57)

[218] Brunelle (2009); Fensel, Werthner, Brunelle and Lapierre (2008)

richer media increases the perception of social presence, which in turn is acknowledged as an important driver of perceived value.[219]

[219] Zhu et al. (2010)